Space Weather Forecast

Issued on Monday, 31 January 2022 at 13:11 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

Space Weather Forecast Headline: G1-G2 Minor to Moderate Storms likely day 3 (2nd) from CME arrival. Chance M-flares (R1/R2 Radio Blackouts).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity is Low with a number of C-class flares observed, Some of these originated from a large but magnetically simple sunspot near the centre of the disc in the northern hemisphere. There are two other notable sunspot regions which have been producing C-flares, both only recently rotated onto the Earth-facing disc, in each hemisphere. Whilst smaller than the previous sunspot, they have more compact fields, and are potentially more unstable due to this. There are three other small and simple sunspot regions on the disc. No Earth-directed coronal mass ejections (CMEs) were observed in available imagery in the last 24 hours

Solar Wind / Geomagnetic Activity: The solar wind remains at elevated to slightly elevated levels, between 450km/s and 510 km/s through the period, although had a period of persistent wind around 510 km/s since midnight. The magnetic field has been weak and whilst the important north-south direction has also been weak, it did become negative (southward pointing) since midnight. This was likely due to a weak CME glancing Earth. Geomagnetic Activity was Quiet to Unsettled.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was at background levels with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Low solar activity is expected through the period, with a chance if Moderate-class flares, and a very slight chance of a Strong flare.

Solar Wind / Geomagnetic Activity: Observed CME from the moderate flare from the large sunspot on the 29th is expected to arrive early day 3 (30th) with a chance very late day 2 (29th). Otherwise solar winds are expected to ease day 1 and 2, before any CME enhancement occurs. This CME influence will likely persist into day 4 (3rd), before receding later that day. Initially Quiet geomagnetic activity will become Active with likely G1/Minor Storm to G2/Moderate storm intervals with the CME arrival. An isolated G3/Strong storm cannot be ruled out. Activity easing to Quiet to Unsettled later day 4 (3rd).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to most likely remain at background levels, however there is a chance of this increasing in response to any significant flares from the large sunspot. No radiation storms are currently expected.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	30	60	20
Strong	G3	No	1	5	15	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	40	40	40	40
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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